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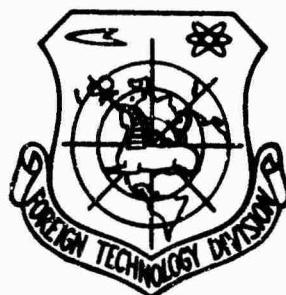
## FOREIGN TECHNOLOGY DIVISION



### DECOY MISSILES

by

Ch'ing Yao



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# EDITED TRANSLATION

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## ABSTRACT

→ The author explains the importance of using decoys in attacking the enemy and introduces the different types of decoys being used today, outlining the different principles followed by different decoys. The author also introduces a few counter-measures against the decoys. Two types of specific guided missile decoys are introduced with some detail in this article, including their sizes, engines, performance, and control systems. Technical drawings for these decoys and other drawings showing the defense systems against attacking guided missiles with decoys are provided. Orig. art. has: 3 figures.

i

## DECOY MISSILES

Ch'ing Yao

All of us may have heard this kind of a story: During bitter fighting in a forward position, a soldier takes off his cap and purposely puts it in a conspicuous place to attract his opponent's attention. At the same time, this soldier attacks the opponent from another direction. The use of decoy missiles derives from the "cap."

No so-called new weapon can possibly be perfect. After its appearance, a corresponding method of combatting it will certainly appear as well.

As an example, the application of radar in air defense makes it possible for the ground air-defense system to detect an invading aerial target from a distance. The use of radar to direct anti-aircraft artillery fire and the use of surface-to-air guided missiles greatly increase the effective killing rate of ground firepower on aerial targets. All these result in difficulties for air raids.

However, there appear in due course measures to combat radar, and one of them is the use of jamming. For instance, large quantities of metallic strips and metallic foils, as well as corner reflectors, balloons, and other objects are dropped from an aircraft, and their return waves are used to create false signals on ground radarscope screens so as to achieve the objective of jamming and confusing the ground radar.

However, the antijamming characteristic of the radar increases accordingly, and the target resolving power is strengthened, and thus jamming is to some degree rendered ineffective.

Therefore, people search further for new jamming measures, and under these circumstances missiles launched for deception have appeared. These missiles are usually controllable. Since they can simulate the flying characteristics of a target, possess radar reflection characteristics similar to those of the target, or are provided with electronic jamming devices, they cause the ground air-defense system to take them readily for the objects to be intercepted.

These missiles fired to confuse ground air-defense systems are generally called decoy missiles.

#### Types and Uses of Decoy Missiles

Decoy missiles can be divided into two types according to the way they are used: air-to-surface and surface-to-surface.

Air-to-surface decoys are generally carried by bombers. When the aircraft discovers that it is being tracked by the opponent's ground air-defense radar, the decoy will be launched at once, thus drawing the air-defense firepower toward itself and freeing the aircraft from the danger of interception. To achieve its purpose of covering the aircraft, the ground radar echo of the decoy must be the same as that of the aircraft. After it accomplishes its covering mission, the aircraft pilot uses remote control to self-destruct the decoy.

Surface-to-surface decoy missiles are launched from the ground, generally flying ahead of the bomber toward the target to be destroyed. When the missile approaches the target, the electronic jamming device on the missile begins to operate, jams the ground air-defense radar, and attracts and consumes the opponent's air-defense firepower, thus covering the bomber that follows and clearing a path for it.

In addition, in order to break through an opponent's anti-missile defense system and blow up the target without difficulty, surface-to-surface medium- and long-range ballistic missiles also use many measures to counter interception, one of them being decoys. In approaching the target, the decoy is launched by a catapult or a small rocket, deceiving the opponent's various sensors, such as optical, infrared, and ultraviolet, with radar as the main object of deception. The decoy can be simple corner reflectors, slow-electron countermeasures (which can refocus the radar energy impinging on it and reflect a stronger return wave), metallic strips, balloons, and other light objects, and can also be a heavy conical-shaped heat-resisting body. This heat-resisting body is a heavy decoy of the heat-resisting type having the same radar-wave reflecting area and conical profile as the missile warhead. It re-enters the atmosphere smoothly with the warhead and effects the covering action, but takes up a considerable part of the missile's payload. An intercontinental missile can carry only five to six heavy decoys, but if they are exchanged for light models, it can carry 25 decoys. However, light decoys are easily burned up in passing through the atmosphere.

Decoy missiles can also be classified as passive and active, according to the different ways of using them to jam ground air-defense radars. Passive decoys make use of the principle of reflected waves to effect jamming of the radar, and therefore comparatively high electric-wave reflectivity is required. Active decoys jam the ground radar by using a jammer which transmits waves having the same frequency as the radar. Another type, upon receiving the radar signal, responds with a radio jamming signal causing radar error.

Let us illustrate by two examples. One is an air-to-surface decoy missile with the profile shown in Fig. 1 left. The missile body is both short and bulky, with an overall length of 4.04 m; the wing is trapezoidal. It is equipped with a J-85 turbojet engine of 1,100-kg thrust. The flying speed is 0.9 times the speed of sound, the range is 320 km, and the service ceiling is about 15,000 m.

Program control or radio command control is used. A high-powered electronic jamming device is installed in the missile's front section.



Fig. 1. Schematic drawings of air-to-surface decoy missile (left) and surface-to-surface decoy missile (right)

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Another type is a surface-to-surface decoy missile, as shown in Fig. 1, right. The profile is like that of an aircraft, with a triangular wing, vertical fin, and rudder, but no horizontal fin. The length is about 9.5 m, and the wingspan is 5.4 m. Its main powerplant is a J-83 turbojet engine of about 900-kg thrust, with the air-scoop located beneath the missile body. At the bottom and between the middle and rear sections is also installed a solid rocket booster for takeoff. The flying speed is about 0.95 times the speed of sound, and the range is from 1,000 to 1,500 km. Inertial guidance is used. A radar responder and other jamming devices are installed on the missile.

The bodies of these two decoy missiles are mostly made of plastics and fiber glass.

#### Operational Problems

A light surface-to-surface decoy missile can be identified as it passes through the atmosphere, because its trajectory differs very much from that of a real warhead due to the effect of air resistance. Therefore, the atmosphere can be used as a defense network for filtering out the light decoys. Then, a missile with excellent acceleration characteristics will be used to intercept the real warheads which enter the atmosphere so as to attain the objective of active defense. Fig. 2 shows schematically the situation when this type of missile is used in attacking a target.

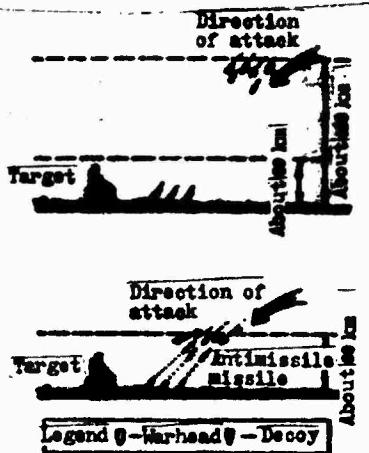


Fig. 2. Schematic drawing of antimissile missile intercepting warheads reentering atmosphere.

However, it is difficult to require a ground radar or other ground detection device to identify completely various decoys and the real target. Therefore, in addition to making persistent efforts to increase the ground air-defense system's ability to identify real and false targets, complete destruction of all the targets including the decoys is also a feasible measure. In this case, the ground air-defense system has to be provided with the capability of attacking multiple targets.

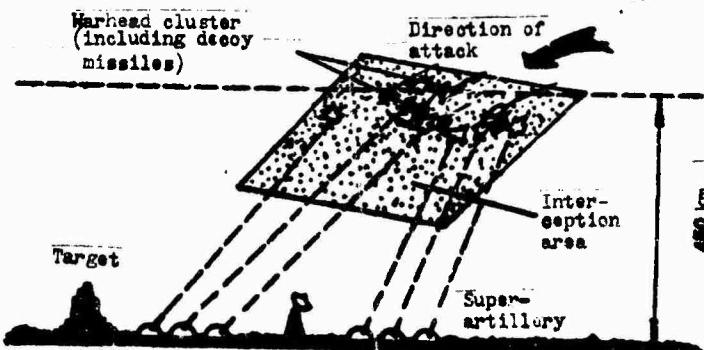


Fig. 3. Concept of "superartillery" intercepting warheads.

In order to cope with multiple targets, some people have recently conceived a plan to use "superartillery" as an antimissile weapon, as shown in Fig. 3, in an attempt to annihilate missiles by means of artillery. This is only a concept and has not been proved in actual practice. Under certain circumstances, decoy missiles can attain the objective of confusion by deceiving the opponent's radar air-defense system. However, it is still most important to rely on the resourcefulness and ingenuity, the fearlessness in the face of death, of men in combat. Only in this way can we effectively annihilate the enemy and preserve ourselves.